



UNITED STATES PATENT AND TRADEMARK OFFICE

mk
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,784	03/26/2001	Kazuhiro Hattori	010328	5542
23850	7590	02/12/2004	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP			VINH, LAN	
1725 K STREET, NW				
SUITE 1000			ART UNIT	
WASHINGTON, DC 20006			PAPER NUMBER	
			1765	

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/816,784

Applicant(s)

HATTORI, KAZUHIRO

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/816,784.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Applicants remarks (filed on 1/22/2004) has been considered and entered. Since the applicants have presented a persuasive argument regarding of the Nakatani reference, the previous final office action (paper no 14) has been withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbons et al (US 6,421,212) in view of DeOrnellas et al (6,287,975) and further in view of Kikitsu et al (US 6,602,620)

Gibbons discloses a method for forming a magnetoresistive element by etching.

This method comprises the steps of :

forming a layer 150 of magnetic material such as CoPt/Cobalt platinum alloy, the layer 150 is etched (col 6, lines 44-46)

forming a protective layer of Ta/Tantalum over/on the layer 150 is usually desirable (col 6, lines 48-49)

etching the CoPt layer 150 using directional etching/ion milling (col 6, lines 26-52), which reads on dry etching the CoPt layer

Art Unit: 1765

Unlike the instant claimed inventions as per claims 1, 2, 4, Gibbons does not specifically disclose using the tantalum/tantalum nitride layer as a mask layer on the CoPt alloy layer

However, DeOrnellas discloses a method for using an hardmask/mask of Ta/TaN (tantalum nitride) in a plasma etching step comprises the step of forming a resist pattern on the metal layer to be etched and sputtering the Ta/TaN mask layer on the metal layer(col 4, lines 3-6, col 5, lines 13-17)

Since Gibbons discloses that it is desirable to form a layer of Ta/Tantalum over/on the CoPt layer 150, one skilled in the art would have found it obvious to employ Gibbons's Ta layer as a mask layer in view of DeOrnellas teaching because DeOrnellas states that an hard mask layer of a reactive metal such as Ta protects at least a part of the layer to be etched in order to define the feature (col 6, lines 50-54)

Gibbons and DeOrnellas fail to disclose the step of dry etching the CoPt alloy layer/magnetic material layer under a reaction gas of a carbon monoxide/Co with an additive of a nitrogen compound gas.

Kikitsu discloses a method of manufacturing a magnetic medium comprises the step of plasma etching a magnetic material layer such as Co alloy using a mixture of CO and nitrogen compound gas such as NH_3 (col 9, lines 50-55, col 49, lines 59-65)

Since Gibbons discloses etching the CoPt layer 150 using directional etching/ion milling/dry etching, one skilled in the art would have found it obvious to modify Gibbons and DeOrnellas by etching the CoPt layer using a mixture of CO and nitrogen compound gas such as NH_3 as per Kikitsu because Kikitsu states that plasma

Art Unit: 1765

generated in CO and/or ammonia/ NH_3 can be employed as a RIE reaction gas for etching the magnetic material (col 21, lines 40-43)

The limitation of forming a resist pattern on the layer to be etched and sputtering a mask layer using Ta, as recited in claims 3, 7, has been discussed above.

4. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbons et al (US 6,421,212) in view of DeOrnellas et al (6,287,975) and Kikitsu et al (US 6,602,620) and further in view of Tao et al (US 5,874,010)

Gibbons as modified by DeOrnellas and Kikitsu has been discussed above in paragraph 3. Unlike the instant claimed inventions as per claims 5, 6, Gibbons, DeOrnellas and Kikitsu do not disclose reactive-sputtering a mask layer (TaN) using a mixture gas of Ar and nitrogen.

However, Tao, in a method of etching the pole material using ion beam etching/dry etching, discloses forming a TaN mask by reactive sputtering using Ar and nitrogen (col 4, lines 4-7)

Since Gibbons and DeOrnellas are directed to an etching method using a TaN mask layer, one skilled in the art would have found it obvious to modify Gibbons, DeOrnellas and Kikitsu by forming a TaN mask using reactive sputtering in the presence of Ar and nitrogen as per Tao because Tao teaches that in the case where mask layer is a nitride, it can be formed by reactive sputtering in the presence of Ar and Nitrogen (col 4, lines 1-7)

Response to Arguments

5. Applicant's arguments filed 1/22/2004 regarding the combination of Gibbons with DeOrnellas have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references of Gibbons and DeOrnellas because Gibbons requires directionally etching without a mask layer provided thereon, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, since Gibbons discloses/suggests forming a protective layer of Ta/Tantalum over/on the layer 150 is usually desirable and the motivation to combine the references (the advantage of using Ta as a mask as taught by DeOrnellas) comes from DeOrnella, one skilled in the art would have found it obvious to employed DeOrnella teaching in Gibbons method to produce the instant claimed invention. Therefore, the examiner still maintains the combination of Gibbons and DeOrnellas in this office action.

Applicant's arguments with respect to the combination of Gibbons, DeOrnellas and Nakatani have been fully considered and are persuasive. The final rejection of claims 1-4, 7 based on the combination of Gibbons, DeOrnellas and Nakatani has been withdrawn.

Art Unit: 1765

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471.

The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV

February 6, 2004